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Transmission part [in particular a wiper arm] in plastic material with differentiated fillers.

BACKGROUND

This invention involves the mechanical transmission by elongated parts made of a plastic material and exposed, at least partially, to the open air. Such parts are used, in particular, as wiper arms, but are also used in the form of connecting rods in the mechanisms of mechanical transmissions.

In this type of use, the plastic material is subjected to severe environmental constraints, mechanical efforts at a high level of repetition, temperature variation, exposure to UV rays, etc. This has resulted in an accelerated aging of the level of mechanical performance, by the appearance of defaults in rigidity and deformation via creep, and at the physical-chemical level via the action of UV rays.

In order to improve the mechanical performance of such parts, it has been proposed in [the document] DE 2839587 to create ^{such parts} [them] in a symmetrical half shell shape in a plastic mold assembled by a molded hinge.

The patent GB 2021939 describes the implementation of a hood of the arm forming a complete streamlining of the arm. The hood is attached by means of regulators and ^{perhaps} made in plastic.

In patent FR 2557052, it was foreseen to cast the metallic arm in order to create a streamlining in plastic material.

These solutions ^{did not} [didn't] resolve the problem evoked because they divulged global solutions, unlikely to ^{adapt} to the changing conditions of the environment.

In order to resolve this problem, ^{summary} and in particular, to improve the mechanical and physical-chemical performance of such parts, the present invention proposes to create ^{such parts} [them] in a plastic material with differentiated fillers, dedicated to more specific functions.

More precisely, the subject of the invention is a mechanical transmission part exposed at least partially to the open air, ^{and} more specifically, a wiper arm, made of a plastic material and containing means of connection arranged on the end portions of the part [this]. ^{This} part is formed, outside of its end portions, of first a body part, forming a streamlining and made of a thermoplastic material filled with at most 30% fibers, and second, a flange not directly exposed, the flange part being made of a thermoplastic material filled with at least

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40% fibers.

Thus, the functions of the mechanical parts are spread in the space in order to be optimized; the body part, which is the "visible" part, exposed to the environment, is dedicated to the function of style by masking the eventual ribs and by resisting physical-chemical attacks, while the flange part, turned towards the windshield and, thus, not directly exposed, achieves the base architecture of the part by exerting, via its improved rigidity compared to the exposed part, a function of mechanical resistance for the unit, with a reduced permanent deformation. The presentation of a closed structure multiplies, by a factor of four, the inertia of the arm against external attacks.

On the other hand, the casting can be simplified by suppression or diminution of the number of ribs.

According to the specific methods of production:

- the percentage of fibers is notably between 20 and 30% for the body part and between 40 to 50% for the flange part;
- the body and the flange form two solidified parts;
- the fibers are glass or textile fibers, such as aramid, polyamides, or polyester;
- the body part contains a system of ribs surrounded by the streamlining;
- the two parts are assembled via gluing, soldering, screwing, riveting, or clipping;
- the windshield washing components, canals and sprayers are directly integrated into the flange;
- the flange is created in the shape of a plaque containing a system of ribs in order to optimize the mechanical performance of the unit; and
- the plaque is inclined in relation to the longitudinal axis of the body in order to improve the aerodynamic performance of the arm.

BRIEF DESCRIPTION OF THE DRAWING

Other characteristics and advantages of the invention will appear in the detailed description which follows, relative to a non-limiting example of production, and which is accompanied by the attached figures which represent, respectively:

Figures 1a and 1b are exploded partially spread upper and lateral cut views of a wiper arm conforming to the description of the invention; Figures 2a and 2b respectively

Figure 1 - ¹⁵figure 2, a transversal cut view according to the II-II plane of Figure 1a.

DETAILED DESCRIPTION
In Figures 1a and 1b, the wiper arm 10 according to the invention presents an generally elongated shape around a median axis X'X, the arm being made up of a body 12, a plaque 14, an end section 16, and a free end portion 18. The section 16 is created in order to assure the articulated mounting of the arm 10 on the alternating rotation of means (not represented) on the arm 10. A transversal rod 15 is designed to hook to a wiping pressure screw (not represented).

Outside of these end parts, the body 12 contains, as illustrated on the exploded part of Figures 1a and 1b, reinforcing ribs 13 coming from casting and made up of transversal inclined partitions forming crosspieces.

Conforming to the invention, the thermoplastic material of the body 12 is filled with 25% glass fibers by weight, while the thermoplastic material of the plaque 14, on which the body 12 rests, is filled by 45% glass fiber by weight. The techniques of incorporating the fibers other than casting are known to a technician in the field.

In this production example, the flange is fixed to the body ¹²via soldering. Before soldering the plaque 14, it is possible to incorporate a canal and sprayers therein in order to install the windshield washing system.

Figure
The transversal cut view in figure 2 shows the upside-down U shape of the body 12, bounded by two lateral side panels 12a and 12b linked by a back 12c and protecting the ribs 13. The body 12 also presents between the ends 12e of the lateral side panels, an opening towards the window to be wiped and which, according to the invention, is closed by the plaque 14.

The invention is not limited to the production example described and represented. Outside of these specific modes of production described above, it is also possible to create the arm ¹⁰in one single piece, the body ¹²and the flange being pre-filled with fibers according to the given percentages or selectively filled in a method other than casting.

In addition, the flange can be created with a variable thickness or a convex curve at one of the ends of the arm, the geometry of the ribs ¹³adapting then to the geometry of the flange. The ribs ¹³can come from casting with the flange and/or the body ¹², the entire unit between the ribs ¹³, the body ¹²and flange being created by means already explained.

above

Flange +
Plaque

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